

CHAPTER 1

Introduction

BACKGROUND

This report documents the methods and technical criteria used by South Florida Water Management District (SFWMD or District) staff to develop minimum flows and levels (MFLs) for Lake Istokpoga.

The *District Water Management Plan* (DWMP) for south Florida (SFWMD 2003a) includes a schedule for establishing MFLs for priority water bodies within the SFWMD. Section 373.042(2), Florida Statutes (F.S.) (**Appendix A**), requires the water management districts to annually review the priority list schedule and make any necessary revisions. This list identified the need to establish MFLs for Lake Istokpoga. The Minimum Flows and Levels Priority List and Schedule was modified in March 2005 and the deadline for establishing these criteria and associated rule development was listed as December 2005 (letter from Henry Dean, SFWMD to Colleen Castille, Florida Department of Environmental Protection, dated April 1, 2005 – see **Appendix A**).

These MFLs are being developed pursuant to the requirements contained within the “Florida Water Resources Act,” specifically Sections 373.042 and 373.0421, F.S. (**Appendix A**), as part of a comprehensive water resources management approach geared towards assuring sustainability of water resources. The proposed MFLs are not “stand alone” resource protection tools, but should be considered in conjunction with all other resource protection responsibilities granted by law to the water management districts. This includes consumptive use and environmental resource permitting, water shortage management and water reservations. A model framework identifying the relationship between these tools was used in developing the MFL and is discussed in this document. In addition, the SFWMD has completed Regional Water Supply Plans pursuant to Chapter 373.0361 F.S., which also include recommendations for establishment of minimum flows and recovery and prevention strategies for those water bodies that are not expected to meet the MFL within the water supply planning horizon (SFWMD 2000a, 2000b and 2000c).

Establishing *minimum* flows and levels alone will not be sufficient to maintain a sustainable resource or protect it from *significant harm* during the broad range of water conditions occurring in the managed system. Setting a minimum level is viewed as one point to define the total water needs for sustainability. For Lake Istokpoga, stabilized water levels relative to historic conditions also impact the resource. The necessary hydrological regime for restoration of the Lake Istokpoga ecosystem must also be defined and implemented through regional water supply plans, lake and watershed management

plans, reexamination of the current regulation schedule, the use of water reservations and other water resource protection tools.

As a component of the Comprehensive Everglades Restoration Plan (CERP), the Lake Okeechobee Watershed Project will examine the Lake Istokpoga Basin with a view towards enhancing fish and wildlife benefits and developing a long-term comprehensive management plan that will create a balance among the environmental needs, water supply and flood control (USACE and SFWMD 1999). That effort will identify seasonal variability requirements and maximum water levels that can be sustained by this system without causing damage to the resource or nearby properties.

As a first formal step to establish MFLs for Lake Istokpoga, this report includes the following:

- Description of the framework for determining MFLs based on best available information (this approach has been applied to other surface and groundwater within the SFWMD).
- Development of a methodology and technical criteria as a basis for establishing MFLs for Lake Istokpoga.
- Supporting data and analyses.

This document will receive independent scientific peer review pursuant to Section 373.042, F.S. (see **Appendix B**) and rule development workshops will be held to discuss MFL concepts proposed for Lake Istokpoga. Persons who wish to receive notice of future workshops, other public meetings and results of the scientific peer review process, should notify the SFWMD.

PROCESS AND BASIS FOR ESTABLISHMENT OF MINIMUM FLOWS AND LEVELS

Process Steps and Activities

The process for establishing minimum flows for Lake Istokpoga is summarized as follows:

1. Through the development of the Kissimmee Basin Water Supply Plan and concurrent staff research and analysis, a methodology and technical basis for establishment of the MFLs was developed.
2. A final draft of the MFL technical criteria document is scheduled for completion in May 2005.
3. Scientific peer review of the technical document is scheduled to be conducted in June of 2005 to verify the criteria pursuant to Section 373.0421, F.S.

4. Revisions to the MFL draft document, as recommended by the peer review panel, will be incorporated into the criteria; a revised draft of the technical report is scheduled for completion in late 2005.
5. Further public consideration of the technical basis and methodology for establishing the MFL and review of the first draft of the rule will be conducted during rule development workshops, beginning in late 2005.
6. A final rule is scheduled to be presented to the Governing Board for adoption in December 2005.

Legal and Policy Basis for Establishment of Minimum Flows and Levels

Florida law requires the water management districts to establish MFLs for surface waters and aquifers within their jurisdiction (Section 373.042(1), F.S.) (**Appendix A**). The minimum flow is defined as the "... limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." The minimum level is defined as the "... limit at which further withdrawals would be significantly harmful to the water resources of the area ..." (Section 373.042(1), F.S.). The statute further directs water management districts to use the best available information in establishing the MFL. Each water management district must also consider, and at its discretion may provide for, the protection of non-consumptive uses in the establishment of MFLs (Section 373.042, F.S.). In addition, a baseline condition for the protected resource functions must be identified through consideration of changes and structural alterations in the hydrologic system (Section 373.042(1), F.S.).

The following sections outline the legal and policy factors relevant to establishing MFLs under Florida law. In summary, the following questions are addressed:

- A. What are the priority functions of each water resource and what are the baseline conditions for the functions being protected?
- B. What level of protection for these functions is provided by the MFL standard of protection, *significant harm*?

Identify Relevant Water Resource Functions

Each surface water body or aquifer serves an array of water resource functions. These functions must be considered when establishing a MFL as a basis for defining *significant harm*.

The term "water resource" is used throughout Chapter 373. Water resource functions protected under Chapter 373 are broad, as illustrated in Section 373.016, F.S., and include flood control, water quality protection, water supply and storage, fish and wildlife protection, navigation and recreation.

The State Water Resource Implementation Rule, Section 62-40.405, F.A.C, outlines specific factors to consider, including protection of natural seasonal changes in water flows or levels, environmental values associated with aquatic and wetland ecology and water levels in aquifer systems. Other specific considerations include:

- Fish and wildlife habitat and the passage of fish.
- Maintenance of freshwater storage and supply.
- Water quality.
- Estuarine resources.
- Transfer of detrital material.
- Filtration and absorption of nutrients and pollutants.
- Sediment loads.
- Recreation in and on the water.
- Navigation.
- Aesthetic and scenic attributes.

The District's Governing Board has the purview to determine which resource functions to consider in establishing MFLs. This analysis requires a comprehensive look at sustainability of the resource itself and its role in sustaining overall regional water resources. **Chapter 3** examines how these provisions apply to the minimum flows proposed for Lake Istokpoga.

Identify Considerations and Exclusions: Baseline Conditions to Protect Water Resource Functions

Once the water resource functions to be protected by a specific minimum flow or level are defined, the baseline resource conditions for assessing *significant harm* must be identified. Considerations for making this determination are set forth in Section 373.0421(1)(a), F.S., which requires the water management districts when setting a MFL, to consider changes and structural alterations that have occurred to a water resource. Likewise, Section 373.0421(1)(b), F.S. (**Appendix A**), recognizes that certain water bodies no longer serve their historical function and that recovery of these water bodies to historical conditions may not be feasible. These provisions are discussed in **Chapter 3** to examine their applicability to the minimum levels that are proposed for Lake Istokpoga.

Level of Protection for Water Resource Functions Provided by the MFL Standard of *Significant Harm*

The overall purpose of Chapter 373 is to ensure the sustainability of state water resources (Section 373.016, F.S.). To carry out this responsibility, Chapter 373 provides the SFWMD with several tools consisting of varying levels of resource protection standards. MFLs play one part in this framework. Determination of the role of MFLs and

the protection that they offer, versus other water resource tools available to the SFWMD, is discussed next.

The scope and context of MFL protection rests with the definition of *significant harm*. The following discussion provides some context to the MFLs statute, including the *significant harm* standard, in relation to other water resource protection statutes.

Sustainability is the umbrella of water resource protection standards (Section 373.016, F.S.). Each water resource protection standard must fit into a statutory function to achieve this overall goal. Pursuant to Parts II and IV of Chapter 373, surface water management and consumptive use permitting regulatory programs must prevent *harm* to the water resource. Water shortage statutes dictate that permitted water supplies must be restricted from use to prevent *serious harm* to the water resources. Other resource protection tools include reservation of water for fish and wildlife, or health and safety (Section 373.223(3), F.S.) and aquifer zoning to prevent undesirable uses of the groundwater (Section 373.036(4)-(5), F.S.). By contrast, MFLs are set at the point at which *significant harm* to the water resources, or ecology, would occur. The levels of *harm* cited above—*harm*, *significant harm* and *serious harm*—are relative resource protection terms, each playing a role in the ultimate goal of achieving a sustainable water resource. The SFWMD has proposed that the conceptual relationship among the terms *harm*, *significant harm* and *serious harm* can be represented as shown in **Figure 1**.

The general narrative definition of *significant harm* proposed by the SFWMD and contained in the Florida Administrative Code (F.A.C.) for the water resources of an area is as follows:

(Chapter 40E-8.021(24), F.A.C.) Significant Harm – means the temporary loss of water resource functions, which result from a change in surface or ground water hydrology, that takes more than two years to recover, but which is considered less severe than serious harm. The specific water resource functions addressed by a MFL and the duration of the recovery period associated with significant harm are defined for each priority water body based on the MFL technical support document.

Other Levels of Harm Considered in Florida Statutes

A discussion of the other levels of harm identified in the conceptual model for consumptive use permitting and water shortage is provided below to give context to the proposed *significant harm* standard.

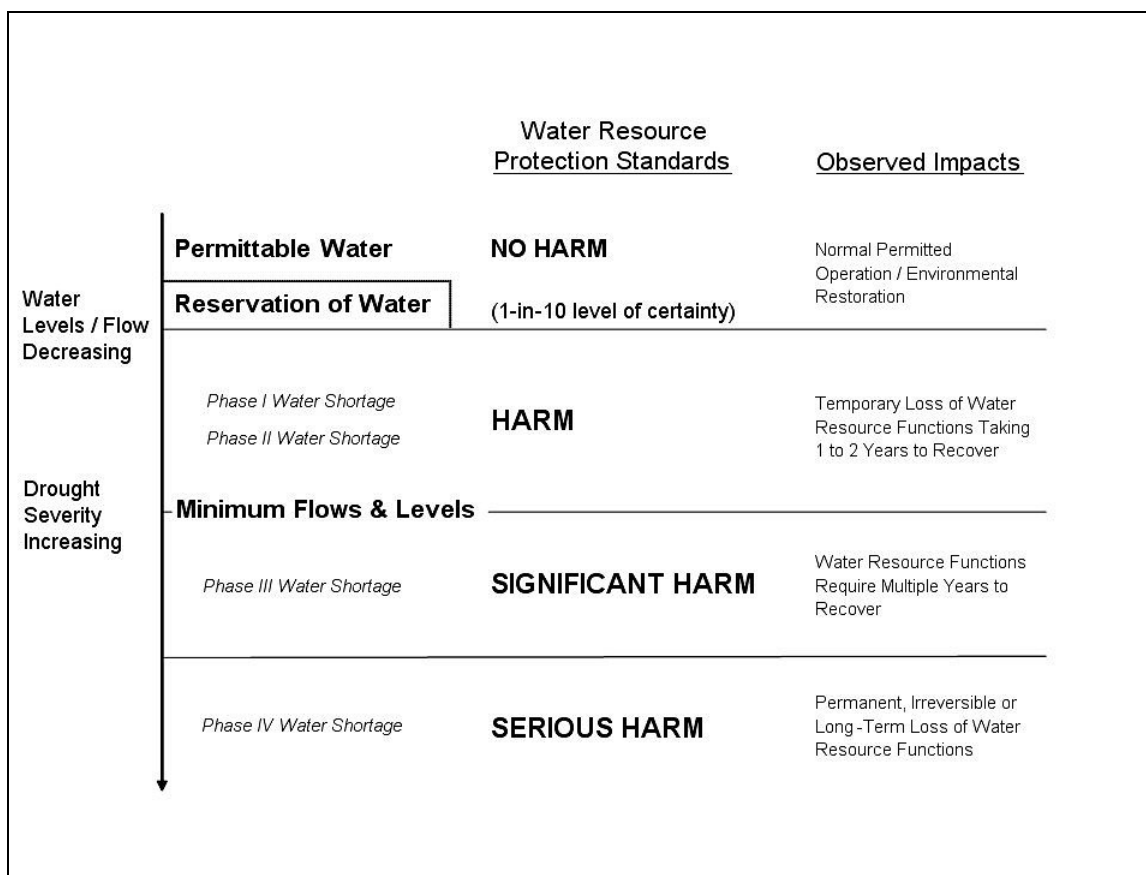


Figure 1. Conceptual Relationships among the Terms Harm, Significant Harm and Serious Harm (from 40E-8.421(1)(b), F.A.C.).

Consumptive Use Permitting Role – Harm Standard

The resource protection criteria used for consumptive use permitting (CUP) are based on the level of impact considered harmful to the water resource. These criteria are applied to various resource functions to establish the range of hydrological change that can occur without *harm*. The hydrological criteria include level, duration and frequency components, and are used to define the amount of water that can be allocated from the resource. Together, saltwater intrusion, wetland drawdown, aquifer mining and pollution prevention criteria in Chapter 40E-2, F.A.C., define the harm standard for purposes of consumptive use allocation. These harm criteria are applied using climate conditions that represent an assumed level of certainty. The level of certainty used in the Kissimmee Basin, Lower West Coast, Lower East Coast and Upper East Coast Regional Water Supply Plans (SFWMD 1998, 2000a, 2000b and 2000c) is a 1-in-10 year drought frequency, as defined in the SFWMD's permitting rules. The 1-in-10 year drought level of certainty is also the water supply planning goal established in Section 373.0361, F.S. The standard for *harm* used in the CUP process is considered as the point at which adverse impacts to water resources can be restored within a period of one to two years of average rainfall conditions. These short-term adverse impacts are addressed for the Consumptive Use Permitting Program, which calculates allocations to meet demands for use during relatively mild, dry season events, defined as the 1-in-10 year drought.

Water Shortage Role – *Serious Harm* Standard

Pursuant to Section 373.246, F.S., water shortage declarations are designed to prevent *serious harm* from occurring to water resources. *Serious harm*, the ultimate harm to the water resources contemplated under Chapter 373, F.S., can be interpreted as long-term, irreversible or permanent impacts. Impacts associated with *serious harm* occur during drought events that are more severe than the 1-in-10 year level of drought used in the CUP criteria.

When drought conditions exist, water users increase withdrawals to supplement water not provided by rainfall, typically for irrigation or outside use. In general, the more severe the drought, the more supplemental water is needed. These increased withdrawals increase the potential for *serious harm* to the water resource.

The SFWMD has implemented its water shortage authority by restricting consumptive uses based on the concept of equitable distribution between users and the water resources (Chapter 40E-21, F.A.C.). Under this program, different levels or phases of water shortage restrictions are imposed relative to the severity of drought conditions. The four phases of the current water shortage restrictions are based on relative levels of risk posed to resource conditions leading up to *serious harm* impacts. Under the District's program, Phase I and Phase II water shortages are primarily designed to prevent *harm*, such as localized, but recoverable, damage to wetlands or short-term inability to maintain water levels needed for resource protection. Actions that may be taken include reducing water use through conservation practices and minor use restrictions, such as car washing and lawn watering. Phases III and IV, however, require use cutbacks that are associated with some level of economic impact to users, such as agricultural irrigation restrictions.

MFL RECOVERY AND PREVENTION STRATEGY

MFLs are implemented through a multifaceted recovery and prevention strategy. Section 373.0421(2), F.S., provides that if it is determined that water flows or levels will exceed the established MFL criteria within the next 20 years, or that water flows or levels are presently below the MFL, the water management district must develop and implement a recovery or prevention strategy. The 20-year period should coincide with the regional water supply plan horizon for the area and the strategy is to be developed in concert with that planning process.

The general goal of the recovery and prevention strategy is to take actions to achieve the MFL criteria, while continuing to provide sufficient water supplies for all reasonable-beneficial uses. If the existing condition of the resource is below the MFL, recovery to the MFL must be achieved "as soon as practicable." Many different factors influence the water management district's ability to punctually implement proposed actions, including funding availability, detailed design development, permissibility of regulated actions, land acquisition and implementation of updated permitting rules.

From a regulatory standpoint, depending on the existing and projected flows or levels, water shortage triggers, interim consumptive use permit criteria, or both, may be recommended in the recovery and prevention strategy. The approach varies depending on whether the MFL is currently exceeded and the cause of the MFL exceedance (e.g., consumptive use withdrawals, poor surface water conveyance facilities or operations, overdrainage or a combination of these).

Incremental measures to achieve the MFL must be included in the recovery and prevention strategy (if needed), as well as a timetable for the provision of water supplies necessary to meet reasonable beneficial uses. Such measures include development of additional water supplies, new or improved storage facilities and conservation or other efficiency measures. These measures must make water available “concurrent with, to the extent practical, and to offset, reductions in permitted withdrawals, consistent with ...[Chapter 373].” The determination of what is “practical” in identifying measures to concurrently replace water supplies will likely be made through consideration of economic and technical feasibility of potential options. Additional information about a recovery and prevention strategy for Lake Istokpoga is provided in **Chapter 6**.

DOCUMENT STRUCTURE

The next section of this report, **Chapter 2**, describes the geographic setting, the resources at risk and major issues concerning the use and conservation of resources within Lake Istokpoga.

Chapter 3 describes resource functions, considerations and exclusions for Lake Istokpoga.

Chapter 4 documents the methods that were used to establish *significant harm* criteria for the different areas, resources and functions.

Chapter 5 presents results of analyses used to define harm standards for Lake Istokpoga and a summary of specific relevant factors that were considered.

The final chapter (**Chapter 6**) provides the specific hydrological criteria developed to indicate the point at which *significant harm* occurs and includes a discussion on the recovery and prevention strategies for Lake Istokpoga, description of research needs and the literature cited section.

Appendices A through **E** are provided at the back of this volume and include technical information, such as descriptions and analysis of methods and tools, supplemental data and analyses, literature, related correspondence, laws, rules, results of the peer review and other activities in the watershed.